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COMPARISON OF SELECTED CONDUCTIVE POLYOLEFIN AND LEAD FLOORINGS--ETC(U)
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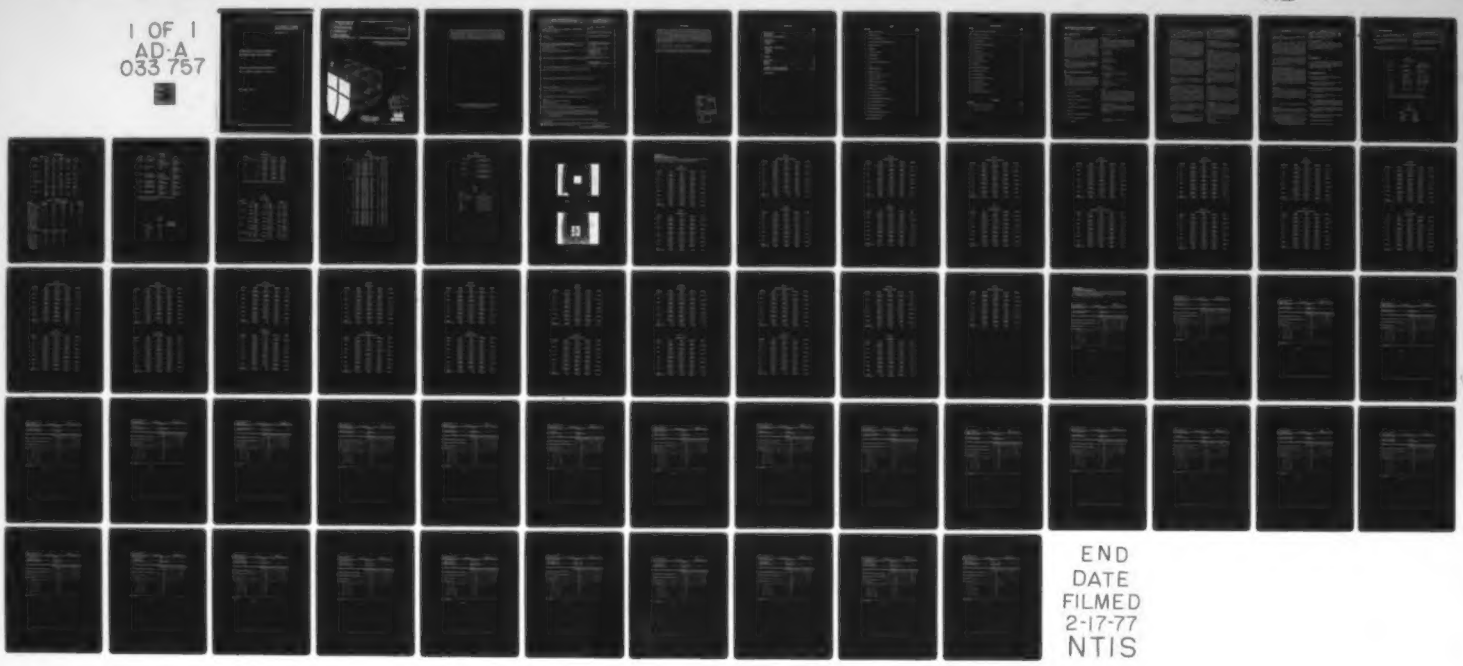

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CONSTRUCTION ENGINEERING RESEARCH LAB. (ARMY), CHAMPAIGN, ILLINOIS

NOVEMBER 1976

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November 1976

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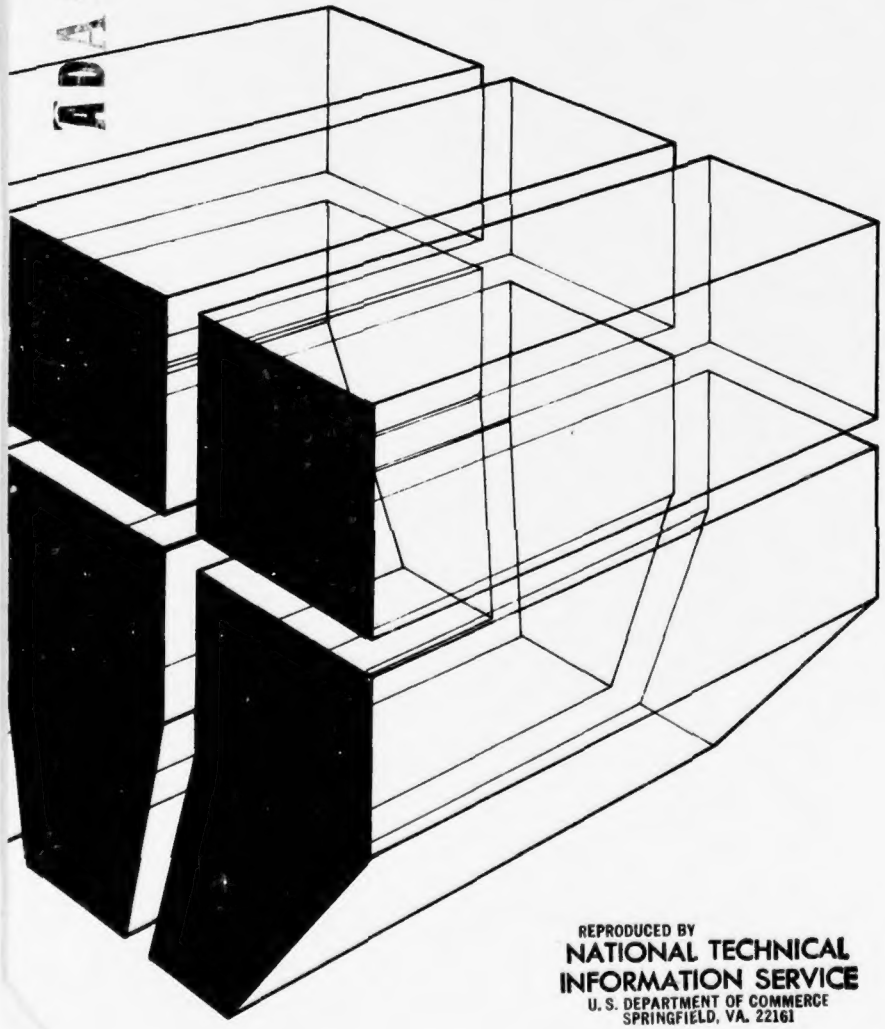

by
Alvin Smith

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report presents the findings of a study to assess particular properties of four conductive polyolefin and two lead flooring materials. The study provides comparative data for use in preparing specifications for constructing appropriate floors for explosive loading and handling facilities.

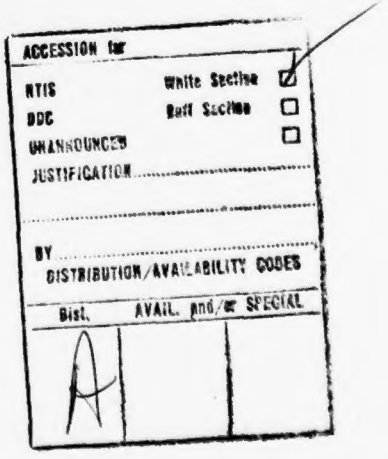
The study shows certain mechanical, chemical, and electrical differences among the test materials.

FOREWORD

This research was conducted for the Huntsville Division (HND), U. S. Army Corps of Engineers, under Intra-Army Order J806, "Conductive Flooring Study, Project Number 5753046." The laboratory studies (except explosive compatibility) were conducted at the U. S. Army Construction Engineering Research Laboratory (CERL), Champaign, IL, by the Construction Materials Branch (MSC) of the Materials and Science Division (MS). The explosive compatibility tests were conducted at the Naval Weapons Support Center, Crane, IN, under the direction of Mr. Richard Stone. All tests were conducted during March through June 1976.

The Technical Coordinator for HND was Mr. Dan Kearney.

COL J. E. Hays is Commander and Director of CERL, and Dr. L. R. Shaffer is Deputy Director. Dr. G. R. Williamson is Chief of MS, and Mr. P. A. Howdyshell is Chief of MSC.



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1 INTRODUCTION

Background

In order to provide safe working conditions in explosive loading and handling facilities, conductive flooring materials must be used to reduce or eliminate the probability of electrostatic discharges. Flooring materials must also wear well, survive typical loads from stationery and moving objects, withstand washing and cleaning, and not be adversely affected by exposure to certain chemicals. The flooring material must be compatible with the explosive being used in the facility and not render it more unstable.

Purpose

The purpose of this study was to provide laboratory data on four conductive polyolefin and two lead flooring materials for use in compiling specifications for explosive loading facilities flooring.

2 LABORATORY EVALUATIONS

Directions

The U. S. Army Corps of Engineers' Huntsville Division provided a list of flooring materials to be tested and specified the evaluation to be performed. Huntsville requested the evaluation of five conductive polyolefin and two thicknesses of sheet lead to determine:

1. Electrical conductivity at 90 and 500 V
2. Spark resistance
3. Chemical compatibility
4. Explosive compatibility (lead azide)
5. Impact resistance
6. Static and dynamic loading resistance
7. Resilience
8. Durability, wear, and humidity resistance
9. Skid resistance (wet and dry)
10. Fire resistance
11. Thermal shock in air and water
12. Cost, repairability, and installation skills required
13. Indentation resistance

Evaluations

Of the five polyolefin materials specified, only four were tested. The fifth, ULTRACLADD, manufactured by Scranton Plastics, had not been received 4 months after the order was placed and was therefore eliminated. The remaining products were:

1. Velostat 1804
   3M Company
   St. Paul, MN
2. Crystal X
   Crystal X Corporation
   Darby, PA
3. Polymax
   TFE Industries
   New Brunswick, NJ
4. V2 Type Ethylene Propylene Copolymer
   3M Company
   St. Paul, MN
5. Lead in sheets of 1/8 in. (3.2 mm) and 1/4 in. (6.4 mm)
   Davison Lead Company
   Chicago, IL

Results

Tables 1-11 provide the results of the evaluations and tests, which are identified by product under headings indicating the particular test or observation. Appendix A contains data showing changes occurring in the specimens during chemical exposure, and Appendix B presents explosive compatibility conditions and results.

Electrical Conductivity

The electrical conductivity of the flooring materials was tested in accordance with AMCR 385-100, paragraph 7-7,[1] at 90 to 500 V. Table 1 gives the resistance values determined.

[1] *Safety Manual*, AMCR 385-100 (Department of the Army, April 1970), p 7.

Spark Resistance

Strips of each flooring material were struck three times in a 3-ft (1-m) arc with a hardened steel file. The tests were conducted at 74°F (23°C), 45 percent relative humidity, and in subdued light. Table 2 presents the results of spark resistance tests.

Chemical Compatibility

Specimens of each test material were tested for resistance to petroleum oil, silicone oil, 25 percent sodium nitrite, ferric oxide powder, potassium chlorate powder, naphtha, and 36 percent nitric acid solution in accordance with ASTM D 543;[2] however, more frequent measurements were taken than are specified in the guidance. Table 3 summarizes the chemical compatibility results, and Appendix A gives complete measurement data.

Explosive Compatibility

Vacuum stability tests were performed in accordance with MIL STD 650[3]. One gram of the polyolefin flooring material was used in each test. Dextrinated lead azide in 0.5-g quantities was used in each test. The test was run at a pressure of 5 mm Hg for 40 hours at 100°C. Table 4 shows that there was no indication of incompatibility. Appendix B presents the data sheets provided by Naval Weapons Support Center, Crane, IN.

Loading

Loading testing of the flooring materials consisted of (a) impact load resistance, (b) static loading, and (c) dynamic loading.

1. Impact resistance tests were performed in compliance with MIL D 3134[4], which requires a 2-lb (.9 kg) steel ball to be dropped 8 ft (2.8 m) onto a specimen. Tests were conducted on specimens of flooring conditioned to −20°F (−29°C), 0°F (−18°C), and 70°F (21°C). A failure occurred when a specimen broke or cracked. Table 5 gives the test results; Figures 1 and 2 show a test specimen before testing and the typical fracture pattern during failure.

2. A static load of 675 psi (46.5 MN/m^2) was applied by placing a load cart on installed strips of flooring for 12 hours at room temperature. No specimen showed evidence of creep or deformation.

3. Dynamic loads (rolling) were applied with a load cart. Each specimen of flooring was subjected to 12 cycles at 675 psi (46.5 MN/m^2) and 200 cycles at 250 psi (17.2 N/m^2) in which the path of roll included a joint area. No failures of either the flooring or of any joint occurred during this test.

Resilience (hardness)

Hardness was measured by specifications from ASTM D 2240[5] for the polyolefins and by a Rockwell tester for the lead. Table 6 presents the values obtained.

Durability

1. *Abrasion resistance* was assessed for each study material. Taber abrasion had been specified, but the test was modified by impinging a stream of aluminum oxide in compressed air onto the face of a specimen held at a 45° angle and from a constant 2-in. (50.8 mm) distance. The softer and more heat-sensitive materials captured some abrasive and gained weight. Visual examination of abraded areas indicated wear of the polyolefin specimens to be essentially the same as that of the lead specimens. Table 7 shows the results.

2. *Humidity*. Pieces of 12 in. by 12 in. (30.5 by 30.5 mm) polyolefin flooring bonded to concrete were exposed to *humidity* conditions as specified in the IAO for this work (95 percent relative humidity for 240 hours). All specimens separated from the concrete, particularly at the corners, but showed no evidence of change.

Skid Resistance

Skid resistance of each of the flooring materials was tested as specified in MIL D 3134[6], paragraph 4.7.6. Conductive shoe sole material was weighted to 4.1 psi (.03 MN/m^2) and tested on dry, water-wet, and methanol-wet installed floor strips. Table 8 shows the load required to cause the test device to slide and the force required to maintain constant sliding velocity.

Fire Resistance

Fire resistance tests were performed in accordance with ASTM D 635[7]. Table 9 shows the extent and rate of burning of the specimens tested. All the polyolefins tested burned freely and slowly. No specimen exceeded the 1-in. (25.4 mm) per minute rate. Simulated service tests were performed by igniting an edge of a specimen

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[2]Test Method D 543 (American Society for Testing and Materials [ASTM], July 1973), pp 154-159.

[3]*Explosive Sampling, Inspection, and Testing*, MIL STD 650, Methods 503.1 and 504.1 (Department of Defense, 1962).

[4]*Deck Covering Materials*, MIL D 3134 (Department of the Navy, 1962), p 5, para 4.7.6.

[5]Test Method D 2240, Part 27 (ASTM, July 1973), pp 660-663.

[6]MIL D 3134, p 6.

[7]Test Method D 635, Part 27 (ASTM, 1973), pp 181-183.

installed on concrete. Burning characteristics and rates were essentially the same as those outlined in Table 9.

Temperature Shock

Tests were performed according to MIL STD 810[8] at 100°F (37°C) and −20°F (−29°C).

1. *Air.* Specimens were subjected to temperature shocks in air from +100°F (37°C) to −20°F (−29°C) by conditioning at one temperature followed by rapid transference to the other. Ten cycles were completed without cracking, peeling, or loss of adhesion from the concrete substrate. Specimens also tested according to methods described in CERL Technical Report M-131[9].

2. *Hot water wash.* Specimens were washed alternately with hot (140°F [60°C]) and cold (55°F [13°C]) water to simulate hot and cold water washdown of floors. No peeling, cracking, or loss of adhesion from the substrate resulted.

Coefficient of Thermal Expansion

The coefficient of thermal expansion of each polyolefin material was determined for comparison with other flooring materials as reported in CERL Technical Report M-166[10]. Gage blocks were cemented to flooring material specimens bonded to concrete slabs. Table 10 lists the coefficient determined for each material. Values reported are representative of the materials' coefficient of expansion when they are bonded to concrete.

Repairability

Installed floors of the materials studied are easily repaired. Damaged areas can be cut out, new pieces cut to fit the area, and the new pieces adhered to the substrate. The new areas can be welded into place by using the manufacturer's recommended practice and materials.

Cost

Table 11 gives the costs for materials used in the study.

Installation Skills

Skills required to properly install the polyolefin flooring materials are reasonably simple. Application of contact cement and emplacing sheets of flooring are straightforward. Welding joints by the hot-air welding technique requires familiarization and practice, but the technique is relatively simple. Manufacturer's guides should be followed in all cases.

Indentation Resistance

A 500-lb (227 kg) load was applied to a 1-sq. in. (645 mm^2) area of each flooring material for 30 min at room temperature. Indentation was minimal in all cases – less than 0.005 in. (1.13 mm).

[8] *Environmental Test Methods,* MIL STD 810, Test Method M503 (Department of Defense, 1975).

[9] A. Smith, *Compatibility Study of Conductive Flooring,* Technical Report M-131 (U.S. Army Construction Engineering Research Laboratory [CERL], 1976).

[10] A. Smith, *Effects of Temperature Cycling on Selected Conductive Flooring,* Technical Report M-166 (CERL, 1976).

3 SUMMARY

Four conductive polyolefin and two thicknesses of sheet lead flooring materials were evaluated. The resultant data will be used to compile specifications for explosive loading facilities flooring.

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All About Welding Plastics (Seklye Plastics Inc., 1975).

Table 1

Electrical Conductivity

Flooring	*	90V	500V or Maxim
Velostat 1804	a	20MA 4500 Ω	300MA @ 370V 1233Ω
	b	20MA	300MA @ 350V 1167Ω
Crystal X	a	15MA 600Ω	50MA 10,000Ω
	b	12.5MA 7200Ω	45MA 11,111Ω
Polymax (TFE)	a	55MA (butt jointed) 1636Ω	275MA @ 300V 1091Ω
	b	25MA 3600Ω	300MA @ 400V 1333Ω
V2 Type	a	2.75MA 32,727Ω	300MA @ 200V 667Ω
	b	6.5MA 13,845Ω	300MA @ 120V 400Ω
Lead 1/4 in. (6.4 mm)		Highly Conductive	Highly Conductive
Lead 1/8 in. (3.2 mm)		Highly Conductive	Highly Conductive

*a Measurements were made on a solid piece of material (uninstalled).
b Measurements were made equidistant from and across a joint in floor.

Table 2

Spark Resistance

Material	Results
Velostat 1804	No Spark
Crystal X	No Spark
Polymax	No Spark
V2 Type	No Spark
Lead	No Spark

Table 3

Chemical Compatibility

Reagent	Specimen 1804	X	Polymax	V2	Lead
Petroleum oil	Slight weight gain	Slight weight gain	Slight weight gain	Slight weight gain	No change
Silicone oil	Slight weight gain	No change	No change	No change	No change
Sodium nitrite	No change	No change	No change	No change	Weight gain
Ferric oxide	No change	No change	No change	No change	No change
Potassium chlorate	No change	No change	No change	No change	No change
Naphtha	Large weight gain	Large weight gain	Weight gain	Weight gain	Slight weight gain
Nitric acid	Slight weight gain	Slight weight gain	No change	No change	Weight loss

Table 4

Summary of Vacuum Stability Test Data

Sample Identification	Sample Weight (g)	Gas Evolved (ml) Test #1	Test #2	Test #3	Average of Gas Evolved
Dextrinated Lead Azide	0.5	0.25	0.08	0.23	0.19
Plastic – Velostat 1804	1.0	0.45	0.61	0.54	0.53
Plastic – Crystal X	1.0	0.23	0.18	0.17	0.19
Plastic – TFE	1.0	0.06	0.12	0.17	0.12
Plastic – Type V2	1.0	0.60	0.75	0.57	0.64
Sheet Metallic Lead	1.0	0.15	0.03	0.00	0.06
Lead Azide and Plastic – Velostat 1804	1.5	0.56	0.47		
Lead Azide and Plastic – Crystal X	1.5	0.24	0.19		0.22
Lead Azide and Plastic – TFE	1.5	0.11	0.11		0.11
Lead Azide and Plastic – Type V2	1.5	0.48	0.55		0.51
Lead Azide and Sheet Metallic Lead	1.5	0.11	0.19		0.15

Reactivity based on average amount of gas evolved (ml) from controlled tests

	Test #1	Test #2	Avg.
Lead Azide and Plastic – Velostat 1804	–0.16	–0.25	–0.21
Lead Azide and Plastic – Crystal X	–0.14	–0.19	–0.17
Lead Azide and Plastic – TFE	–0.20	–0.20	–0.20
Lead Azide and Plastic – Type V2	–0.35	–0.28	–0.32
Lead Azide and Sheet Metallic Lead	–0.14	–0.06	0.10

Table 5

Impact Resistance*

Specimen	-20°F (-29°C)	0°F (-18°C)	70°F (21°C)
Velostat 1804	Broke (shattered) on first impact	No break two impacts Approx. 1/16 in. (1.6 mm) indentation	No break two impacts 1/16 in. (1.6 mm) indentation
V2 Type	Broke on first impact	Broke on first impact	No break two impacts 1/16 in. (1.6 mm) indentation
Polymax	Approx. 1/16 in. (1.6 mm) indentation on each impact	No break two impacts Approx. 1/16 in. (1.6 mm) indentation	No break two impacts 1/16 in. (1.6 mm) indentation
Crystal X	Little indentation on either impact	No breaks Little indentation	No breaks Little indentation
Lead 1/4	Indentation about 1/16 in. (1.6 mm)	No break 1/16 in. (1.6 mm) indentation	No break 1/16 in. (1.6 mm) indentation
Lead 1/8	Indentation about 1/16 in. (1.6 mm)	No break 1/16 in. (1.6 mm) indentation	No break 1/16 in. (1.6 mm) indentation

* Tests were conducted on uninstalled and installed flooring specimens. Results were the same in both cases.

Table 6

Resilience

Specimen	Durometer	Rockwell H 1/8 in. (3.2 mm) Ball 60 kg Weight
Velostat 1804	60D	
Crystal X	53D	
Polymax	68D	
V2 Type	74D	
Lead	65D	45H

Table 7

Abrasion Resistance

Sample		Wgt. Before	Wgt. After	Change
1/8 in. (3.2 mm) Lead	-3	195.0182 g	194.2522 g	-0.7560 g
	-4	195.3665 g	194.6457 g	-0.7208 g
1804	-5	25.5325 g	25.5309 g	-0.0016 g
	-6	25.1552 g	25.1931 g	+0.0379 g
X	-7	25.9026 g	25.9290 g	+0.0264 g
	-8	25.3839 g	26.4163 g	+0.0324 g
TFE	-9	12.3007 g	12.2696 g	-0.0311 g
	-10	13.8370 g	13.8132 g	-0.0238 g
V2	-11	25.4377 g	25.4458 g	+0.0081 g
	-12	25.0612 g	25.0633 g	+0.0021 g

NOTE: Weight gains are due to embedding of abrasive particles in the samples.

Table 8

Skid Resistance*

Specimen	Dry	Water	Methanol
Velostat 1804	To Start: 13 lb (5.9 kg)	To Start: 15 lb (6.8 kg)	To Start: 16 lb (7.3 kg)
	Sliding: 16 lb (7.3 kg)	Sliding: 19 lb (8.6 kg)	Sliding: 19 lb (8.6 kg)
V2 Type	To Start: 11 lb (5 kg)	To Start: 13 lb (5.9 kg)	To Start: 17 lb (7.7 kg)
	Sliding: 14 lb (6.3 kg)	Sliding: 15 lb (6.8 kg)	Sliding: 15 lb (6.8 kg)
Crystal X	To Start: 17 lb (7.7 kg)	To Start: 20 lb (9.1 kg)	To Start: 20 lb (9.1 kg)
	Sliding: 21 lb (9.5 kg)	Sliding: 22 lb (10.0 kg)	Sliding: 22 lb (10.0 kg)
Lead	To Start: 20 lb (9.1 kg)	To Start: 21 lb (9.5 kg)	To Start: 22 lb (10.0 kg)
	Sliding: 19 lb (8.6 kg)	Sliding: 23 lb (10.4 kg)	Sliding: 24 lb (10.9 kg)
Polymax (TFE)	To Start: 7 lb (3.2 kg)	To Start: 6 lb (2.7 kg)	To Start: 6 lb (2.7 kg)
	Sliding: 9 lb (4.1 kg)	Sliding: 7 lb (3.2 kg)	Sliding: 7 lb (3.2 kg)

* Values are in pounds pull on a spring balance.

Table 9

Flammability

Specimen		t	t-30 min	Extent of Burning mm	Extent of Burning in.	Rate/min. mm	Rate/min. in.
TFE	1	337.6	307.6 (5.12)	100	4	19.5	.78
	2	361.5	331.5 (5.52)	100	4	18.1	.72
	3	333.0	303.0 (5.02)	100	4	19.8	.79
	4	319.3	289.3 (4.82)	100	4	20.7	.83
	5	273.0	243.0 (4.05)	100	4	24.7	.99
	6	325.2	295.2 (4.92)	100	4	20.3	.81
	7	343.0	313.0 (5.22)	100	4	19.1	.77
	8	327.2	297.2 (4.95)	100	4	20.2	.81
	9	295.3	265.3 (4.42)	100	4	22.6	.90
	10	296.0	266.0 (4.43)	100	4	22.6	.90
Crystal X	1	403.6	373.6 (6.22)	100	4	16.1	.64
	2	404.6	374.6 (6.23)	100	4	16.1	.64
	3	424.2	394.2 (6.57)	100	4	15.2	.61
	4	420.9	390.9 (6.50)	100	4	15.3	.62
	5	402.6	372.6 (6.20)	100	4	16.0	.63
	6	415.5	385.5 (6.42)	100	4	15.6	.62
	7	392.6	362.6 (6.03)	100	4	16.6	.66
	8	363.0	333.0 (5.55)	100	4	18.0	.72
	9	405.0	375.0 (6.25)	100	4	16.0	.64
	10	386.1	356.1 (5.93)	100	4	16.7	.67
V2	1	423.7	393.7 (6.58)	100	4	15.2	.61
	2	413.6	383.6 (6.39)	100	4	15.6	.63
	3	446.0	415.0 (6.93)	100	4	14.4	.58
	4	468.3	438.3 (7.30)	100	4	13.7	.55
	5	414.1	384.1 (6.40)	100	4	15.6	.63
	6	380.0	350.0 (5.83)	100	4	17.1	.69
	7	417.1	387.1 (6.45)	100	4	15.5	.62
	8	384.0	354.0 (5.90)	100	4	16.9	.68
	9	367.4	337.4 (5.61)	100	4	17.8	.71
	10	370.5	340.5 (5.67)	100	4	17.6	.70
1804	1	481.2	451.2 (7.52)	100	4	13.3	.53
	2	459.0	429.0 (7.15)	100	4	14.0	.56
	3	474.3	444.8 (7.41)	100	4	13.5	.54
	4	460.0	430.0 (7.15)	100	4	14.0	.56
	5	470.3	440.3 (7.33)	100	4	13.6	.55
	6	417.4	387.4 (6.45)	100	4	15.5	.62
	7	456.5	426.5 (7.10)	100	4	14.1	.56
	8	426.4	396.4 (6.60)	100	4	15.2	.61
	9	456.5	426.5 (7.10)	100	4	14.1	.56
	10	460.2	430.2 (7.15)	100	4	14.0	.56

Table 10

Coefficient of Thermal Expansion

Velostat 1804	5.9×10^{-5} in./in./°F (10.6×10^{-5} mm/mm/°C)
Crystal X	5.1×10^{-5} in./in./°F (9.2×10^{-5} mm/mm/°C)
Polymax	5.9×10^{-5} in./in./°F (10.6×10^{-5} mm/mm/°C)
V2 Type	4.6×10^{-5} in./in./°F (8.3×10^{-5} mm/mm/°C)

Table 11

Cost

Material	Cost
Lead – 1/8 in. (3.2 mm)	$4.96/sq ft ($53.37/sq m)
Lead – 1/4 in. (6.4 mm)	$7.84/sq ft ($84.36/sq m)
V2	$3.43/sq ft ($36.91/sq m)
1804	$3.12/sq ft ($33.57/sq m)
Crystal X	$3.43/sq ft ($36.91/sq m)
Polymax	$3.40/sq ft ($36.58/sq m)

Figure 1. Specimen V2 prior to impact test.

Figure 2. Specimen V2 after impact test.

APPENDIX A:
CHEMICAL COMPATIBILITY

Tables A1 through A35 show the dimensional and weight changes that occurred in the flooring specimens during exposure to the chemical reagents of interest.

Table A1

1804/Petroleum Oil

Exposure	Length	Width	Thickness	Weight
Initial	2.997 in. 76.124 mm	.987 in. 25.070 mm	.184 in. 4.674 mm	9.5013 g
24 hrs	2.998 in. 76.149 mm	.986 in. 25.044 mm	.184 in. 4.674 mm	9.5442 g
48 hrs	3.000 in. 76.200 mm	.983 in. 24.968 mm	.184 in. 4.674 mm	9.5512 g
72 hrs	3.002 in. 76.251 mm	.988 in. 25.095 mm	.184 in. 4.674 mm	9.5572 g
144 hrs	3.001 in. 76.225 mm	.988 in. 25.095 mm	.184 in. 4.674 mm	9.5680 g
168 hrs	3.002 in. 76.251 mm	.989 in. 25.121 mm	.183 in. 4.648 mm	9.5714 g
192 hrs	3.002 in. 76.251 mm	.989 in. 25.121 mm	.183 in. 4.648 mm	9.5305 g
Change Initial to Final	+.005 in. +.127 mm	+.002 in. +.051 mm	-.001 in. -.025 mm	+.0292 g

Table A2

1804/Silicone Oil

Exposure	Length	Width	Thickness	Weight
Initial	2.998 in. 76.149 mm	.947 in. 25.054 mm	.183 in. 4.648 mm	9.2524 g
24 hrs	3.000 in. 76.200 mm	.947 in. 24.054 mm	.183 in. 4.648 mm	9.2588 g
48 hrs	3.000 in. 76.200 mm	.944 in. 23.978 mm	.183 in. 4.648 mm	9.2557 g
72 hrs	3.000 in. 76.200 mm	.946 in. 24.028 mm	.183 in. 4.648 mm	9.2601 g
144 hrs	3.000 in. 76.200 mm	.947 in. 24.054 mm	.183 in. 4.648 mm	9.2585 g
168 hrs	3.000 in. 76.200 mm	.948 in. 24.079 mm	.183 in. 4.648 mm	9.2584 g
192 hrs	3.001 in. 76.225 mm	.948 in. 24.079 mm	.183 in. 4.648 mm	9.2657 g
Change Initial to Final	+.003 in. +.076 mm	+.001 in. +.025 mm	0 in. 0 mm	+.0133 g

Table A3

1804/Sodium Nitrite (25 percent)

Exposure	Length	Width	Thickness	Weight
Initial	2.996 in. 76.098 mm	.978 in. 24.841 mm	.183 in. 4.648 mm	9.5668 g
24 hrs	2.995 in. 76.048 mm	.979 in. 24.867 mm	.184 in. 4.674 mm	9.5686 g
48 hrs	2.994 in. 76.048 mm	.976 in. 24.790 mm	.183 in. 4.648 mm	9.5718 g
72 hrs	2.999 in. 76.175 mm	.976 in. 24.790 mm	.183 in. 4.648 mm	9.5740 g
144 hrs	2.999 in. 76.175 mm	.978 in. 24.841 mm	.183 in. 4.648 mm	9.5761 g
168 hrs	3.000 in. 76.200 mm	.978 in. 24.841 mm	.183 in. 4.648 mm	9.5778 g
192 hrs	3.000 in. 76.200 mm	.978 in. 24.841 mm	.183 in. 4.648 mm	9.5784 g
Change Initial to Final	+.004 in. +.102 mm	0 in. 0 mm	0 in. 0 mm	+.0016 g

Table A4

1804/Ferric Oxide

Exposure	Length	Width	Thickness	Weight
Initial	2.990 in. 75.946 mm	1.000 in. 25.400 mm	.183 in. 4.648 mm	9.7229 g
24 hrs	2.992 in. 75.997 mm	1.000 in. 25.400 mm	.181 in. 4.597 mm	9.7206 g
48 hrs	2.990 in. 75.946 mm	.997 in. 25.349 mm	.182 in. 4.623 mm	9.7280 g
72 hrs	2.990 in. 75.946 mm	.988 in. 25.400 mm	.182 in. 4.623 mm	9.7251 g
144 hrs	2.990 in. 75.946 mm	1.000 in. 25.400 mm	.182 in. 4.623 mm	9.7251 g
168 hrs	2.992 in. 75.997 mm	.999 in. 25.375 mm	.182 in. 4.623 mm	9.7252 g
192 hrs	2.992 in. 75.997 mm	.999 in. 25.375 mm	.182 in. 4.623 mm	9.7248 g
Change Initial to Final	+.002 in. +.051 mm	-.001 in. -.025 mm	-.001 in. -.025 mm	+.0019 g

Table A5

1804/Potassium Chlorate

Exposure	Length	Width	Thickness	Weight
Initial	3.010 in. 76.454 mm	.967 in. 24.562 mm	.182 in. 4.623 mm	9.4293 g
24 hrs	3.012 in. 76.505 mm	.968 in. 24.587 mm	.182 in. 4.623 mm	9.4277 g
48 hrs	3.013 in. 76.530 mm	.968 in. 24.587 mm	.182 in. 4.623 mm	9.4282 g
72 hrs	3.014 in. 76.556 mm	.968 in. 24.587 mm	.183 in. 4.648 mm	9.4287 g
144 hrs	3.014 in. 76.556 mm	.968 in. 24.587 mm	.183 in. 4.648 mm	9.4292 g
168 hrs	3.014 in. 76.556 mm	.968 in. 24.587 mm	.183 in. 4.648 mm	9.4297 g
192 hrs	3.014 in. 76.556 mm	.968 in. 24.587 mm	.183 in. 4.648 mm	9.4298 g
Change Initial to Final	+.004 in. +.102 mm	+.001 in. +.025 mm	+.001 in. +.025 mm	+.0005 g

Table A6

1804/Naphtha

Exposure	Length	Width	Thickness	Weight
Initial	3.009 in. 76.429 mm	1.005 in. 25.427 mm	.183 in. 4.648 mm	9.8394 g
24 hrs	3.044 in. 77.318 mm	1.014 in. 25.756 mm	.190 in. 4.826 mm	10.3920 g
48 hrs	3.087 in. 78.410 mm	1.031 in. 26.187 mm	.192 in. 4.877 mm	10.7310 g
72 hrs	3.137 in. 79.680 mm	1.044 in. 26.518 mm	.193 in. 4.902 mm	11.0840 g
144 hrs	3.168 in. 80.467 mm	1.058 in. 26.873 mm	.195 in. 4.953 mm	11.3640 g
168 hrs	3.170 in. 80.518 mm	1.059 in. 26.899 mm	.195 in. 4.953 mm	11.3770 g
192 hrs	3.176 in. 80.670 mm	1.160 in. 29.464 mm	195 in. 4.953 mm	11.4150 g
Change Initial to Final	+.167 in. +4.242 mm	+.155 in. +3.937 mm	+.012 in. +.305 mm	+1.5756 g

Table A7

1804/Nitric Acid (36 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.001 in. 76.225 mm	1.010 in. 25.645 mm	.181 in. 4.597 mm	9.6627 g
24 hrs	3.006 in. 76.352 mm	1.013 in. 25.730 mm	.182 in. 4.597 mm	9.6746 g
48 hrs	3.005 in. 76.327 mm	1.010 in. 25.654 mm	.181 in. 4.597 mm	9.6823 g
72 hrs	3.006 in. 76.352 mm	1.011 in. 25.679 mm	.181 in. 4.597 mm	9.6841 g
144 hrs	3.006 in. 76.352 mm	1.011 in. 25.679 mm	.181 in. 4.597 mm	9.6886 g
168 hrs	3.005 in. 76.327 mm	1.012 in. 25.705 mm	.181 in. 4.597 mm	9.6890 g
192 hrs	3.005 in. 76.327 mm	1.013 in. 25.730 mm	.181 in. 4.597 mm	9.6900 g
Change Initial to Final	+.004 in. +.102 mm	+.003 in. +.076 mm	0 in. 0 mm	+.0273 g

Table A8

Crystal X/Petroleum Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.000 in. 76.200 mm	1.009 in. 25.629 mm	.192 in. 4.877 mm	10.2889 g
24 hrs	2.998 in. 76.149 mm	1.097 in. 27.864 mm	.191 in. 4.851 mm	10.3164 g
48 hrs	3.003 in. 76.276 mm	.996 in. 25.298 mm	.191 in. 4.851 mm	10.3324 g
72 hrs	3.007 in. 76.378 mm	1.002 in. 25.451 mm	.191 in. 4.851 mm	10.3471 g
144 hrs	3.006 in. 76.352 mm	1.003 in. 25.476 mm	.191 in. 4.851 mm	10.3730 g
168 hrs	3.006 in. 76.352 mm	1.003 in. 25.476 mm	.191 in. 4.851 mm	10.3798 g
192 hrs	3.006 in. 76.352 mm	1.003 in. 25.476 mm	.191 in. 4.851 mm	10.3850 g
Change Initial to Final	+.006 in. +.152 mm	-.006 in. -.152 mm	-.001 in. -.025 mm	+.0961 g

Table A9

Crystal X/Silicone Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.005 in. 76.327 mm	.983 in. 24.968 mm	.191 in. 4.851 mm	10.1955 g
24 hrs	3.004 in. 76.302 mm	.981 in. 24.917 mm	.190 in. 4.826 mm	10.1946 g
48 hrs	3.005 in. 76.327 mm	.980 in. 24.892 mm	.190 in. 4.826 mm	10.1943 g
72 hrs	3.007 in. 76.378 mm	.982 in. 24.943 mm	.190 in. 4.826 mm	10.1940 g
144 hrs	3.006 in. 76.352 mm	.982 in. 24.943 mm	.190 in. 4.826 mm	10.1923 g
168 hrs	3.006 in. 76.352 mm	.982 in. 24.943 mm	.190 in. 4.826 mm	10.1920 g
192 hrs	3.006 in. 76.352 mm	.982 in. 24.943 mm	.190 in. 4.826 mm	10.1977 g
Change Initial to Final	+.001 in. +.025 mm	-.001 in. -.025 mm	-.001 in. -.025 mm	+.0022 g

Table A10

Crystal X/Sodium Nitrite (25 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.008 in. 76.403 mm	1.026 in. 26.060 mm	.191 in. 4.851 mm	10.7066 g
24 hrs	3.009 in. 76.429 mm	1.027 in. 26.086 mm	.190 in. 4.826 mm	10.7068 g
48 hrs	3.009 in. 76.429 mm	1.028 in. 26.111 mm	.190 in. 4.826 mm	10.7093 g
72 hrs	3.013 in. 76.530 mm	1.032 in. 26.213 mm	.190 in. 4.826 mm	10.7110 g
144 hrs	3.013 in. 76.530 mm	1.032 in. 26.213 mm	.190 in. 4.826 mm	10.7114 g
168 hrs	3.013 in. 76.530 mm	1.032 in. 26.213 mm	.190 in. 4.826 mm	10.7130 g
192 hrs	3.013 in. 76.530 mm	1.032 in. 26.213 mm	.190 in. 4.826 mm	10.7125 g
Change Initial to Final	+.005 in. +.127 mm	+.006 in. +.152 mm	-.001 in. -.025 mm	+.0059 g

Table A11

Crystal X/Ferric Oxide

Exposure	Length	Width	Thickness	Weight
Initial	3.015 in. 76.581 mm	.982 in. 24.943 mm	.187 in. 4.750 mm	10.1275 g
24 hrs	3.014 in. 76.556 mm	.981 in. 24.917 mm	.187 in. 4.750 mm	10.1346 g
48 hrs	3.019 in. 76.683 mm	.983 in. 24.968 mm	.187 in. 4.750 mm	10.1320 g
72 hrs	3.017 in. 76.632 mm	.982 in. 24.943 mm	.189 in. 4.801 mm	10.1279 g
144 hrs	3.014 in. 76.556 mm	.983 in. 24.968 mm	.190 in. 4.826 mm	10.1263 g
168 hrs	3.014 in. 76.556 mm	.983 in. 24.968 mm	.190 in. 4.826 mm	10.1276 g
192 hrs	3.016 in. 76.606 mm	.984 in. 24.994 mm	.190 in. 4.826 mm	10.1273 g
Change Initial to Final	+.001 in. +.025 mm	+.002 in. +.051 mm	+.003 in. +.076 mm	-.0002 g

Table A12

Crystal X/Potassium Chlorate

Exposure	Length	Width	Thickness	Weight
Initial	3.013 in. 76.530 mm	.955 in. 24.257 mm	.189 in. 4.801 mm	9.9128 g
24 hrs	3.013 in. 76.530 mm	.949 in. 25.105 mm	.189 in. 4.801 mm	9.9109 g
48 hrs	3.014 in. 76.556 mm	.949 in. 24.105 mm	.190 in. 4.826 mm	9.9120 g
72 hrs	3.018 in. 76.657 mm	.952 in. 24.181 mm	.191 in. 4.851 mm	9.9117 g
144 hrs	3.018 in. 76.657 mm	.953 in. 24.206 mm	.191 in. 4.851 mm	9.9135 g
168 hrs	3.018 in. 76.657 mm	.953 in. 24.206 mm	.191 in. 4.851 mm	9.9137 g
192 hrs	3.018 in. 76.657 mm	.953 in. 24.206 mm	.191 in. 4.851 mm	9.9140 g
Change Initial to Final	+.005 in. +.127 mm	+.002 in. +.051 mm	+.002 in. +.051 mm	+.0012 g

Table A13

Crystal X/Naphtha

Exposure	Length	Width	Thickness	Weight
Initial	3.005 in. 76.327 mm	.950 in. 24.130 mm	.191 in. 4.851 mm	9.8536 g
24 hrs	3.316 in. 84.226 mm	1.054 in. 26.772 mm	.220 in. 5.588 mm	13.2930 g
48 hrs	3.452 in. 87.681 mm	1.100 in. 27.940 mm	.230 in. 5.842 mm	15.0030 g
72 hrs	3.530 in. 89.662 mm	1.126 in. 28.600 mm	.232 in. 5.893 mm	15.8730 g
144 hrs	3.517 in. 89.332 mm	1.129 in. 28.677 mm	.235 in. 5.969 mm	15.8130 g
168 hrs	3.523 in. 89.484 mm	1.130 in. 28.702 mm	.236 in. 5.994 mm	15.8330 g
192 hrs	3.553 in. 90.246 mm	1.132 in. 28.753 mm	.237 in. 6.020 mm	15.8990 g
Change Initial to Final	+.547 in. +13.894 mm	+.182 in. +4.623 mm	+.046 in. +1.168 mm	+6.0454 g

Table A14

Crystal X/Nitric Acid (36 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.002 in. 76.251 mm	.994 in. 25.248 mm	.190 in. 4.826 mm	10.2067 g
24 hrs	3.009 in. 76.429 mm	.999 in. 25.375 mm	.190 in. 4.826 mm	10.2370 g
48 hrs	3.005 in. 76.327 mm	.997 in. 25.324 mm	.190 in. 4.826 mm	10.2555 g
72 hrs	3.006 in. 76.352 mm	.996 in. 25.298 mm	.190 in. 4.826 mm	10.2617 g
144 hrs	3.007 in. 76.378 mm	.996 in. 25.298 mm	.191 in. 4.851 mm	10.2773 g
168 hrs	3.007 in. 76.378 mm	.996 in. 25.298 mm	.191 in. 4.851 mm	10.2794 g
192 hrs	3.008 in. 76.403 mm	.996 in. 25.298 mm	.191 in. 4.851 mm	10.2840 g
Change Initial to Final	+.006 in. +.152 mm	+.002 in. +.051 mm	+.001 in. +.025 mm	+.0773 g

Table A15

Polymax/Petroleum Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.008 in. 76.403 mm	1.026 in. 26.060 mm	.113 in. 2.870 mm	5.5517 g
24 hrs	3.009 in. 76.429 mm	1.024 in. 26.010 mm	.114 in. 2.896 mm	5.5572 g
48 hrs	3.009 in. 76.429 mm	1.025 in. 26.035 mm	.112 in. 2.845 mm	5.5596 g
72 hrs	3.013 in. 76.530 mm	1.027 in. 26.086 mm	.114 in. 2.896 mm	5.5621 g
144 hrs	3.010 in. 76.454 mm	1.026 in. 26.086 mm	.116 in. 2.946 mm	5.5654 g
168 hrs	3.010 in. 76.454 mm	1.028 in. 26.111 mm	.116 in. 2.946 mm	5.5663 g
192 hrs	3.010 in. 76.454 mm	1.028 in. 26.111 mm	.116 in. 2.946 mm	5.5680 g
Change Initial to Final	+.002 in. +.051 mm	+.002 in. +.051 mm	+.003 in. +.076 mm	+.0163 g

Table A16

Polymax/Silicone Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.004 in. 76.302 mm	1.000 in. 25.400 mm	.112 in. 2.845 mm	5.3110 g
24 hrs	3.007 in. 76.378 mm	1.000 in. 25.400 mm	.111 in. 2.819 mm	5.3158 g
48 hrs	3.005 in. 76.327 mm	1.000 in. 25.400 mm	.111 in. 2.819 mm	5.3150 g
72 hrs	3.009 in. 76.429 mm	1.002 in. 25.451 mm	.112 in. 2.845 mm	5.3150 g
144 hrs	3.007 in. 76.378 mm	1.001 in 25.425 mm	.112 in. 2.845 mm	5.3150 g
168 hrs	3.007 in. 76.378 mm	1.001 in. 25.425 mm	.112 in. 2.845 mm	5.3180 g
192 hrs	3.007 in. 76.378 mm	1.001 in. 25.425 mm	.112 in. 2.845 mm	5.3190 g
Change Initial to Final	+.003 in. +.076 mm	+.001 in. +.025 mm	0 in. 0 mm	+.0080 g

Table A17

Polymax/Sodium Nitrite (25 percent)

Exposure	Length	Width	Thickness	Weight
Initial	2.984 in. 75.794 mm	1.060 in. 26.924 mm	.113 in. 2.870 mm	5.6750 g
24 hrs	2.985 in. 75.819 mm	1.060 in. 26.924 mm	.115 in. 2.921 mm	5.6748 g
48 hrs	2.987 in. 75.870 mm	1.060 in. 26.924 mm	.114 in. 2.896 mm	5.6761 g
72 hrs	2.988 in. 75.895 mm	1.060 in. 26.924 mm	.115 in. 2.921 mm	5.6775 g
144 hrs	2.987 in. 75.870 mm	1.060 in. 22.924 mm	.115 in. 2.921 mm	5.6768 g
168 hrs	2.987 in. 75.870 mm	1.061 in. 26.949 mm	.115 in. 2.946 mm	5.6776 g
192 hrs	2.987 in. 75.870 mm	1.061 in. 26.949 mm	.116 in. 2.946 mm	5.6792 g
Change Initial to Final	+.003 in. +.076 mm	+.001 in. +.025 mm	+.003 in. +.076 mm	+.0042 g

Table A18

Polymax/Ferric Oxide

Exposure	Length	Width	Thickness	Weight
Initial	3.016 in. 76.606 mm	1.050 in. 26.670 mm	.113 in. 2.870 mm	5.6470 g
24 hrs	3.020 in. 76.708 mm	1.048 in. 26.619 mm	.113 in. 2.870 mm	5.6464 g
48 hrs	3.013 in. 76.530 mm	1.049 in. 26.645 mm	.115 in. 2.921 mm	5.6480 g
72 hrs	3.013 in. 76.530 mm	1.049 in. 26.645 mm	.115 in. 2.921 mm	5.6470 g
144 hrs	3.013 in. 76.530 mm	1.050 in. 26.670 mm	.116 in. 2.946 mm	5.6480 g
168 hrs	3.014 in. 76.556 mm	1.049 in. 26.645 mm	.116 in. 2.946 mm	5.6476 g
192 hrs	3.015 in. 76.581 mm	1.051 in. 26.695 mm	.116 in. 2.946 mm	5.6486 g
Change Initial to Final	+.001 in. +.025 mm	+.001 in. +.025 mm	+.003 in. +.076 mm	+.0016 g

Table A19

Polymax/Potassium Chlorate

Exposure	Length	Width	Thickness	Weight
Initial	3.003 in. 76.276 mm	1.035 in. 26.289 mm	.111 in. 2.819 mm	5.4800 g
24 hrs	3.006 in. 76.352 mm	1.034 in. 26.264 mm	.112 in. 2.845 mm	5.4793 g
48 hrs	3.008 in. 76.403 mm	1.034 in. 26.264 mm	.113 in. 2.870 mm	5.4804 g
72 hrs	3.007 in. 76.378 mm	1.034 in. 26.264 mm	.113 in. 2.870 mm	5.4805 g
144 hrs	3.007 in. 76.378 mm	1.034 in. 26.264 mm	.113 in. 2.870 mm	5.4812 g
168 hrs	3.007 in. 76.378 mm	1.034 in. 26.264 mm	.113 in. 2.870 mm	5.4818 g
192 hrs	3.007 in. 76.378 mm	1.035 in. 26.289 mm	.115 in. 2.921 mm	5.4821 g
Change Initial to Final	+.004 in. +.102 mm	0 in. 0 mm	+.004 in. +.102 mm	+.0021 g

Table A20

Polymax/Naphtha

Exposure	Length	Width	Thickness	Weight
Initial	2.996 in. 76.098 mm	.995 in. 25.273 mm	.110 in. 2.794 mm	5.3886 g
24 hrs	3.016 in. 76.606 mm	1.002 in. 25.451 mm	.113 in. 2.870 mm	5.5086 g
48 hrs	3.029 in. 76.937 mm	1.005 in. 25.527 mm	.115 in. 2.921 mm	5.5850 g
72 hrs	3.042 in. 77.267 mm	1.008 in. 25.603 mm	.116 in. 2.946 mm	5.6480 g
144 hrs	3.062 in. 77.775 mm	1.015 in. 25.781 mm	.116 in. 2.946 mm	5.7480 g
168 hrs	3.063 in. 77.800 mm	1.015 in. 25.781 mm	.116 in. 2.946 mm	5.7580 g
192 hrs	3.069 in. 77.953 mm	1.017 in. 25.832 mm	.116 in. 2.946 mm	5.7680 g
Change Initial to Final	+.073 in. 1.854 mm	+.022 in. +.559 mm	+.006 in. +.152 mm	+.3794 g

Table A21

Polymax/Nitric Acid (36 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.000 in. 76.200 mm	1.041 in. 26.441 mm	.112 in. 2.845 mm	5.5928 g
24 hrs	3.019 in. 76.683 mm	1.038 in. 26.365 mm	.112 in. 2.845 mm	5.5950 g
48 hrs	3.017 in. 76.632 mm	1.040 in. 26.416 mm	.113 in. 2.870 mm	5.5966 g
72 hrs	3.015 in. 76.581 mm	1.040 in. 26.416 mm	.113 in. 2.870 mm	5.5955 g
144 hrs	3.015 in. 76.581 mm	1.041 in. 26.441 mm	.113 in. 2.870 mm	5.5970 g
168 hrs	3.015 in. 76.581 mm	1.041 in. 26.441 mm	.113 in. 2.870 mm	5.5972 g
192 hrs	3.016 in. 76.606 mm	1.041 in. 26.441 mm	.113 in. 2.870 mm	5.5966 g
Change Initial to Final	+.016 in. +.406 mm	0 in. 0 mm	+.001 in. +.025 mm	+.0038 g

Table A22

V2/Petroleum Oil

Exposure	Length	Width	Thickness	Weight
Initial	2.988 in. 75.895 mm	.951 in. 24.155 mm	.182 in. 4.623 mm	9.0435 g
24 hrs	2.988 in. 75.895 mm	.948 in. 24.079 mm	.183 in. 4.648 mm	9.0515 g
48 hrs	2.987 in. 75.870 mm	.951 in. 24.155 mm	.183 in. 4.648 mm	9.0544 g
72 hrs	2.900 in. 75.946 mm	.950 in. 24.130 mm	.183 in. 4.648 mm	9.0577 g
144 hrs	2.989 in. 75.921 mm	.950 in. 24.155 mm	.183 in. 4.648 mm	9.0654 g
168 hrs	2.989 in. 75.921 mm	.951 in. 24.155 mm	.183 in. 4.648 mm	9.0656 g
192 hrs	2.989 in. 75.921 mm	.951 in. 24.155 mm	.183 in. 4.648 mm	9.0673 g
Change Initial to Final	+.001 in. +.025 mm	0 in. 0 mm	+.001 in. +.025 mm	+.0238 g

Table A23

V2/Silicone Oil

Exposure	Length	Width	Thickness	Weight
Initial	2.980 in. 75.692 mm	.970 in. 24.638 mm	.185 in. 4.699 mm	9.1567 g
24 hrs	2.981 in. 75.717 mm	.968 in. 24.587 mm	.183 in. 4.648 mm	9.1618 g
48 hrs	2.979 in. 75.667 mm	.967 in. 24.562 mm	.183 in. 4.648 mm	9.1594 g
72 hrs	2.981 in. 75.717 mm	.968 in. 24.587 mm	.184 in. 4.674 mm	9.1621 g
144 hrs	2.981 in. 75.717 mm	.968 in. 24.587 mm	.184 in. 4.674 mm	9.1600 g
168 hrs	2.981 in. 75.717 mm	.968 in. 24.587 mm	.184 in. 4.674 mm	9.1630 g
192 hrs	2.981 in. 75.717 mm	.968 in. 24.587 mm	.184 in. 4.674 mm	9.1640 g
Change Initial to Final	+.001 in. +.025 mm	-.002 in. -.051 mm	-.001 in. -.025 mm	+.0073 g

Table A24

V2/Sodium Nitrite (25 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.000 in. 76.200 mm	.970 in. 24.638 mm	.170 in. 4.318 mm	8.6702 g
24 hrs	2.998 in. 76.149 mm	.979 in. 24.867 mm	.171 in. 4.343 mm	8.6700 g
48 hrs	2.997 in. 76.124 mm	.976 in. 24.790 mm	.173 in. 4.394 mm	8.6722 g
72 hrs	2.997 in. 76.124 mm	.977 in. 24.816 mm	.174 in. 4.420 mm	8.6740 g
144 hrs	2.997 in. 76.124 mm	.977 in. 24.816 mm	.174 in. 4.420 mm	8.6750 g
168 hrs	2.997 in. 76.124 mm	.977 in. 24.816 mm	.174 in. 4.420 mm	8.6768 g
192 hrs	2.997 in. 76.124 mm	.977 in. 24.816 mm	.174 in. 4.420 mm	8.6770 g
Change Initial to Final	-.003 in. -.076 mm	+.007 in. +.178 mm	+.004 in. +.102 mm	+.0068 g

Table A25

V2/Ferric Oxide

Exposure	Length	Width	Thickness	Weight
Initial	2.998 in. 76.022 mm	.970 in. 24.638 mm	.186 in. 4.724 mm	9.2539 g
24 hrs	2.992 in. 75.997 mm	.970 in. 24.638 mm	.185 in. 4.699 mm	9.2528 g
48 hrs	2.992 in. 75.997 mm	.970 in. 24.638 mm	.185 in. 4.699 mm	9.2578 g
72 hrs	2.992 in. 75.997 mm	.971 in. 24.663 mm	.185 in. 4.699 mm	9.2564 g
144 hrs	2.991 in. 75.971 mm	.971 in. 24.663 mm	.185 in. 4.699 mm	9.2563 g
168 hrs	2.991 in. 75.971 mm	.971 in. 24.663 mm	.185 in. 4.699 mm	9.2578 g
192 hrs	2.991 in. 75.971 mm	.971 in. 24.663 mm	.185 in. 4.699 mm	9.2577 g
Change Initial to Final	-.002 in. -.051 mm	+.001 in. +.025 mm	+.001 in. +.025 mm	+.0038 g

Table A26

V2/Potassium Chlorate

Exposure	Length	Width	Thickness	Weight
Initial	2.995 in. 76.073 mm	.967 in. 24.562 mm	.182 in. 4.623 mm	9.0725 g
24 hrs	2.990 in. 75.946 mm	.967 in. 24.562 mm	.182 in. 4.623 mm	9.0705 g
48 hrs	2.998 in. 75.895 mm	.965 in. 24.511 mm	.183 in. 4.648 mm	9.0729 g
72 hrs	2.998 in. 75.895 mm	.967 in. 24.562 mm	.183 in. 4.648 mm	9.0728 g
144 hrs	2.998 in. 75.895 mm	.967 in. 24.562 mm	.183 in. 4.648 mm	9.0731 g
168 hrs	2.998 in. 75.895 mm	.967 in. 24.562 mm	.183 in. 4.648 mm	9.0732 g
192 hrs	2.989 in. 75.921 mm	.967 in. 24.562 mm	.183 in. 4.648 mm	9.0741 g
Change Initial to Final	-.006 in. -.152 mm	0 in. 0 mm	+.001 in. +.025 mm	+.0016 g

Table A27

V2/Naphtha

Exposure	Length	Width	Thickness	Weight
Initial	2.997 in. 76.124 mm	.964 in. 24.486 mm	.187 in. 4.750 mm	9.3193 g
24 hrs	3.004 in. 76.302 mm	.968 in. 24.587 mm	.191 in. 4.851 mm	9.6450 g
48 hrs	3.019 in. 76.683 mm	.973 in. 24.714 mm	.194 in. 4.928 mm	9.8440 g
72 hrs	3.033 in. 77.038 mm	.982 in. 24.943 mm	.197 in. 5.004 mm	10.0490 g
144 hrs	3.120 in. 79.248 mm	1.003 in. 25.476 mm	.198 in. 5.029 mm	10.5770 g
168 hrs	3.136 in. 79.654 mm	1.005 in. 25.527 mm	.199 in. 5.055 mm	10.6790 g
192 hrs	3.154 in. 80.112 mm	1.111 in. 28.219 mm	.200 in. 5.080 mm	10.8130 g
Change Initial to Final	+.157 in. +3.988 mm	+.147 in. +3.734 mm	+.013 in. +.330 mm	+.4937 g

Table A28

V2/Nitric Acid (36 percent)

Exposure	Length	Width	Thickness	Weight
Initial	2.907 in. 73.838 mm	.966 in. 24.536 mm	.186 in. 4.724 mm	8.9954 g
24 hrs	2.907 in. 73.838 mm	.965 in. 24.511 mm	.187 in. 4.750 mm	9.0007 g
48 hrs	2.906 in. 73.812 mm	.965 in. 24.511 mm	.185 in. 4.699 mm	9.0020 g
72 hrs	2.907 in. 73.838 mm	.964 in. 24.486 mm	.185 in. 4.699 mm	9.0017 g
144 hrs	2.907 in. 73.838 mm	.964 in. 24.486 mm	.185 in. 4.699 mm	9.0038 g
168 hrs	2.907 in. 73.838 mm	.964 in. 24.486 mm	.185 in. 4.699 mm	9.0043 g
192 hrs	2.907 in. 73.838 mm	.964 in. 24.486 mm	.185 in. 4.699 mm	9.0044 g
Change Initial to Final	0 in. 0 mm	-.002 in. -.051 mm	-.001 in. -.025 mm	+.0090 g

Table A29

Lead/Petroleum Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.048 in. 77.419 mm	1.016 in. 25.806 mm	.132 in. 3.353 mm	74.7617 g
24 hrs	3.052 in. 77.521 mm	1.016 in. 25.806 mm	.134 in. 3.404 mm	74.7529 g
48 hrs	3.048 in. 77.419 mm	1.018 in. 25.857 mm	.132 in. 3.353 mm	74.7427 g
72 hrs	3.049 in. 77.445 mm	1.019 in. 25.883 mm	.132 in. 3.353 mm	74.7250 g
144 hrs	3.048 in. 77.419 mm	1.019 in. 25.883 mm	.132 in. 3.353 mm	74.7400 g
168 hrs	3.048 in. 77.419 mm	1.019 in. 25.883 mm	.132 in. 3.353 mm	74.7336 g
192 hrs	3.048 in. 77.419 mm	1.019 in. 25.883 mm	.132 in. 3.353 mm	74.7300 g
Change Initial to Final	0 in. 0 mm	+.003 in. +.076 mm	0 in. 0 mm	-.0317 g

Table A30

Lead/Silicone Oil

Exposure	Length	Width	Thickness	Weight
Initial	3.022 in. 76.759 mm	1.047 in. 26.594 mm	.134 in. 3.404 mm	77.2964 g
24 hrs	3.020 in. 76.708 mm	1.053 in. 26.746 mm	.137 in. 3.480 mm	77.2955 g
48 hrs	3.025 in. 76.835 mm	1.056 in. 26.822 mm	.137 in. 3.480 mm	77.2892 g
72 hrs	3.024 in. 76.810 mm	1.053 in. 26.746 mm	.136 in. 3.454 mm	77.2845 g
144 hrs	3.024 in. 76.810 mm	1.053 in. 26.746 mm	.136 in. 3.454 mm	77.2803 g
168 hrs	3.024 in. 76.810 mm	1.053 in. 26.746 mm	.136 in. 3.454 mm	77.2760 g
192 hrs	3.024 in. 76.810 mm	1.054 in. 26.772 mm	.136 in. 3.454 mm	77.2720 g
Change Initial to Final	+.002 in. +.051 mm	+.007 in. +.178 mm	+.002 in. +.051 mm	-.0244 g

Table A31

Lead/Sodium Nitrite (25 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.060 in. 77.724 mm	1.006 in. 25.552 mm	.132 in. 3.353 mm	75.0852 g
24 hrs	3.055 in. 77.597 mm	1.010 in. 25.654 mm	.135 in. 3.429 mm	75.0760 g
48 hrs	3.052 in. 77.521 mm	1.012 in. 25.705 mm	.134 in. 3.404 mm	75.0701 g
72 hrs	3.054 in. 77.572 mm	1.012 in. 25.705 mm	.134 in. 3.404 mm	75.0647 g
144 hrs	3.053 in. 77.546 mm	1.012 in. 25.705 mm	.134 in. 3.404 mm	75.0570 g
168 hrs	3.053 in. 77.546 mm	1.012 in. 25.705 mm	.135 in. 3.429 mm	75.0490 g
192 hrs	3.053 in. 77.546 mm	1.012 in. 25.705 mm	.135 in. 3.429 mm	75.4300 g
Change Initial to Final	-.007 in. -.178 mm	+.006 in. +.152 mm	+.003 in. +.076 mm	-.3448 g

Table A32

Lead/Ferric Oxide

Exposure	Length	Width	Thickness	Weight
Initial	3.034 in. 77.064 mm	1.030 in. 26.162 mm	.133 in. 3.378 mm	75.3819 g
24 hrs	3.034 in. 77.064 mm	1.029 in. 26.137 mm	.131 in. 3.327 mm	75.3800 g
48 hrs	3.032 in. 77.013 mm	1.032 in. 26.213 mm	.132 in. 3.353 mm	75.3824 g
72 hrs	3.032 in. 77.013 mm	1.032 in. 26.213 mm	.132 in. 3.353 mm	75.3783 g
144 hrs	3.033 in. 77.038 mm	1.030 in. 26.162 mm	.132 in. 3.353 mm	75.3744 g
168 hrs	3.033 in. 77.038 mm	1.030 in. 26.162 mm	.132 in. 3.353 mm	75.3720 g
192 hrs	3.033 in. 77.038 mm	1.030 in. 26.162 mm	.132 in. 3.353 mm	75.3720 g
Change Initial to Final	-.001 in. -.025 mm	0 in. 0 mm	-.001 in. -.025 mm	-.0099 g

Table A33

Lead/Potassium Chlorate

Exposure	Length	Width	Thickness	Weight
Initial	3.030 in. 76.962 mm	1.110 in. 28.194 mm	.132 in. 3.353 mm	80.6239 g
24 hrs	3.031 in. 76.987 mm	1.110 in. 28.194 mm	.131 in. 3.327 mm	80.6217 g
48 hrs	3.033 in. 77.038 mm	1.112 in. 28.245 mm	.132 in. 3.353 mm	80.6210 g
72 hrs	3.033 in. 77.038 mm	1.113 in. 28.270 mm	.132 in. 3.353 mm	80.6186 g
144 hrs	3.033 in. 77.038 mm	1.113 in. 28.270 mm	.132 in. 3.353 mm	80.6153 g
168 hrs	3.033 in. 77.038 mm	1.113 in. 28.270 mm	.132 in. 3.353 mm	80.6151 g
192 hrs	3.033 in. 77.038 mm	1.113 in. 28.270 mm	.132 in. 3.353 mm	80.5142 g
Change Initial to Final	+.003 in. +.076 mm	+.003 in. +.076 mm	0 in. 0 mm	-.0077 g

Table A34

Lead/Naphtha

Exposure	Length	Width	Thickness	Weight
Initial	3.010 in. 76.454 mm	1.067 in. 27.102 mm	.132 in. 3.353 mm	77.2166 g
24 hrs	3.011 in. 76.479 mm	1.066 in. 27.076 mm	.133 in. 3.378 mm	77.2075 g
48 hrs	3.010 in. 76.454 mm	1.070 in. 27.178 mm	.133 in. 3.378 mm	77.2024 g
72 hrs	3.010 in. 76.454 mm	1.070 in. 27.178 mm	.134 in. 3.404 mm	77.1957 g
144 hrs	3.010 in. 76.454 mm	1.070 in. 27.178 mm	.133 in. 3.378 mm	77.1940 g
168 hrs	3.010 in. 76.454 mm	1.070 in. 27.178 mm	.133 in. 3.378 mm	77.1890 g
192 hrs	3.010 in. 76.454 mm	1.070 in. 27.178 mm	.133 in. 3.378 mm	77.1850 g
Change Initial to Final	0 in. 0 mm	+.003 in. +.076 mm	+.001 in. +.025 mm	-.0316 g

Table A35

Lead/Nitric Acid (36 percent)

Exposure	Length	Width	Thickness	Weight
Initial	3.023 in. 76.784 mm	1.055 in. 26.797 mm	.133 in. 3.378 mm	76.6500 g
24 hrs	3.016 in. 76.606 mm	1.035 in. 26.287 mm	.127 in. 3.226 mm	67.3983 g
48 hrs	3.011 in. 76.479 mm	1.033 in. 26.238 mm	.127 in. 3.226 mm	65.1882 g
72 hrs	3.008 in. 76.403 mm	1.025 in. 26.035 mm	.126 in. 3.200 mm	63.1293 g
144 hrs	3.008 in. 76.403 mm	1.025 in. 26.035 mm	.115 in. 2.921 mm	63.0950 g
168 hrs	3.008 in. 76.403 mm	1.025 in. 26.035 mm	.115 in. 2.921 mm	63.1180 g
192 hrs	3.008 in. 76.403 mm	1.025 in. 26.035 mm	.114 in. 2.896 mm	62.7177 g
Change Initial to Final	-.015 in. -.831 mm	-.030 in. -.762 mm	-.019 in. -.483 mm	-.9323 g

APPENDIX B:
EXPLOSIVE COMPATIBILITY

The data sheets in this appendix give data obtained in tests of compatibility of the polyolefin flooring materials and dextrinated lead azide. A final volume of gas greater than 5.0 ml typically indicates questionable compatibility.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.	
Dextrinated Lead Azide	0.5 gm.	
CAPILLARY AND TUBE NO.	SAMPLE VOLUME	
5 3	0.1 ml.	
	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	776	774
Height From Mercury Column to Mark	42	55
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

A = 17.94 + 0.26 - 0.1 = 18.10
B = 0.88×10^{-3}
C = 361 + 55 = 416
C_1 = 361 + 42 = 403
H = 774 - 55 = 719
H_1 = 776 - 42 = 734
P = 737.3
P_1 = 741.3
t = 21.5
t_1 = 21.5

CALCULATIONS

0.25 ml.

VACUUM STABILITY TEST
QND-NADC (SP 9/74

Test Run #1

5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Metallic Lead	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
27	0.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	765	763
Height From Mercury Column to Mark	25	32
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

$A = 16.46 + 7.05 - 0.1 = 23.41$

$B = 3.06 \times 10^{-3}$

$C = 368 + 32 = 400$

$C_1 = 368 + 25 = 393$

$H = 763 - 32 = 731$

$H_1 = 765 - 25 = 740$

$P = 737.3$

$P_1 = 741.3$

$t = 21.5$

$t_1 = 21.5$

CALCULATIONS

0.15 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #1

5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Type V-2 Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
24 E	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	765	764
Height From Mercury Column to Mark	37	68
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

A = 17.83 + 0.21 - 1.1 = 16.94

B = 1.18×10^{-3}

C = 361 + 68 = 429

C_1 = 361 + 37 = 398

H = 764 - 68 = 696

H_1 = 765 - 37 = 728

P = 737.3

P_1 = 741.3

t = 21.5

t_1 = 21.5

CALCULATIONS

0.60 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Crystal X Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
30	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	747	747
Height From Mercury Column to Mark	19	31
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

$A = 16.27 + 6.86 - 1.1 = 22.03$

$B = 3.10 \times 10^{-3}$

$C = 375 + 31 = 406$

$C_1 = 375 + 19 = 394$

$H = 747 - 31 = 716$

$H_1 = 747 - 19 = 728$

$P = 737.3$

$P_1 = 741.3$

$t = 21.5$

$t_1 = 21.5$

CALCULATIONS

0.23 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #1

5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Velostat 1804 Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
8	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	773	773
Height From Mercury Column to Mark	49	74
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

$A = 17.82 + 0.29 - 1.1 = 17.01$

$B = 0.94 \times 10^{-3}$

$C = 361 + 74 = 435$

$C_1 = 361 + 49 = 410$

$H = 773 - 74 = 699$

$H_1 = 773 - 49 = 724$

$P = 737.3$

$P_1 = 741.3$

$t = 21.5$

$t_1 = 21.5$

CALCULATIONS

0.45 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/12/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
TFE Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
14 A	1.0 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	764	765
Height From Mercury Column to Mark	35	43
Barometric Pressure	741.3	737.3
Room Temperature	21.5	21.5

A = 17.95 + 0.23 - 1.0 = 17.18

B = 0.92×10^{-3}

C = 366 + 43 = 409

C_1 = 366 + 35 = 401

H = 765 - 43 = 722

H_1 = 764 - 35 = 729

P = 737.3

P_1 = 741.3

t = 21.5

t_1 = 21.5

CALCULATIONS

0.06 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #2 5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Dextrinated Lead Azide	0.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
37	0.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	752	753
Height From Mercury Column to Mark	19	20
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

A = 16.29 + 3.61 - 0.1 = 19.80

B = 3.44×10^{-3}

C = 369 + 20 = 389

C_1 = 369 + 19 = 388

H = 753 - 20 = 733

H_1 = 752 - 19 = 731

P = 742.6

P_1 = 737.4

t = 23.3

t_1 = 23.7

CALCULATIONS

0.08 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #2 5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Velostat 1804 Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
34	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	757	759
Height From Mercury Column to Mark	34	54
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

$A = 16.49 + 3.57 - 1.1 = 20.06$ $H_1 = 757 - 34 = 723$

$B = 3.42 \times 10^{-3}$ $P = 742.6$

$C = 370 + 54 = 424$ $P_1 = 737.4$

$C_1 = 370 + 34 = 404$ $t = 23.3$

$H = 759 - 54 = 705$ $t_1 = 23.7$

CALCULATIONS

0.61 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #2 5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Crystal X Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
27	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	763	763
Height From Mercury Column to Mark	33	34
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

$A = 16.46 + 7.05 - 1.1 = 22.41$ $H_1 = 763 - 33 = 730$

$B = 3.06 \times 10^{-3}$ $P = 742.6$

$C = 368 + 34 = 402$ $P_1 = 737.4$

$C_1 = 368 + 33 = 401$ $t = 23.3$

$H = 763 - 34 = 729$ $t_1 = 23.7$

CALCULATIONS

0.18 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #2

5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
TFE Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
30	1.0 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	743	743
Height From Mercury Column to Mark	18	17
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

$A = 16.27 + 6.86 - 1.0 = 22.13$

$B = 3.10 \times 10^{-3}$

$C = 375 + 17 = 392$

$C_1 = 375 + 18 = 393$

$H = 743 - 17 = 726$

$H_1 = 743 - 18 = 725$

$P = 742.6$

$P_1 = 737.4$

$t = 23.3$

$t_1 = 23.7$

CALCULATIONS

0.12 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #2

5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Type V-2 Plastic	1.0 gm.
CAPILLARY AND TUBE NO. 29 35	SAMPLE VOLUME 1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	761	763
Height From Mercury Column to Mark	32	55
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

$A = 16.29 + 7.02 - 1.1 = 22.21$

$B = 3.06 \times 10^{-3}$

$C = 364 + 55 = 419$

$C_1 = 364 + 32 = 396$

$H = 763 - 55 = 708$

$H_1 = 761 - 32 = 729$

$P = 742.6$

$P_1 = 737.4$

$t = 23.3$

$t_1 = 23.7$

CALCULATIONS

0.75 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #2 5/24/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Metallic Lead	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
36	0.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	750	751
Height From Mercury Column to Mark	18	15
Barometric Pressure	737.4	742.6
Room Temperature	23.7	23.3

$A = 16.45 + 3.45 - 0.1 = 19.80$ $H_1 = 750 - 18 = 732$

$B = 3.51 \times 10^{-3}$ $P = 742.6$

$C = 356 + 15 = 371$ $P_1 = 737.4$

$C_1 = 356 + 18 = 374$ $t = 23.3$

$H = 751 - 15 = 736$ $t_1 = 23.7$

CALCULATIONS

0.03 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #3

6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dextrinated)	0.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
36	0.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	752	751
Height From Mercury Column to Mark	18	21
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 16.45 + 3.45 - 0.1 = 19.80$

$B = 3.51 \times 10^{-3}$

$C = 356 + 21 = 377$

$C_1 = 356 + 18 = 374$

$H = 751 - 21 = 730$

$H_1 = 752 - 18 = 734$

$P = 744.3$

$P_1 = 739.3$

$t = 23.5$

$t_1 = 24.0$

CALCULATIONS

0.23 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #3 6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Crystal X Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
1 A	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	767	765
Height From Mercury Column to Mark	40	41
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 17.95 + 0.24 - 1.1 = 17.09$ $H_1 = 767 - 40 = 727$

$B = 0.92 \times 10^{-3}$ $P = 744.3$

$C = 371 + 41 = 412$ $P_1 = 739.3$

$C_1 = 371 + 40 = 411$ $t = 23.5$

$H = 765 - 41 = 724$ $t_1 = 24.0$

CALCULATIONS

0.17 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #3 6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Type V-2 Plastic	1.0 gm.
CAPILLARY AND TUBE NO. 31 33	SAMPLE VOLUME 1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	745	746
Height From Mercury Column to Mark	17	33
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 16.19 + 7.22 - 1.1 = 22.31$ $H_1 = 745 - 17 = 728$

$B = 3.09 \times 10^{-3}$ $P = 744.3$

$C = 366 + 33 = 399$ $P_1 = 739.3$

$C_1 = 366 + 17 = 383$ $t = 23.5$

$H = 746 - 33 = 713$ $t_1 = 24.0$

CALCULATIONS

0.57 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #3

6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
TFE Plastic	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
34 35	1.0 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	756	758
Height From Mercury Column to Mark	26	30
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 16.29 + 3.57 - 1.0 = 18.86$

$B = 3.42 \times 10^{-3}$

$C = 370 + 30 = 400$

$C_1 = 370 + 26 = 396$

$H = 758 - 30 = 728$

$H_1 = 756 - 26 = 730$

$P = 744.3$

$P_1 = 739.3$

$t = 23.5$

$t_1 = 24.0$

CALCULATIONS

0.17 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #3 6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Velostat 1804 (Plastic)	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
30	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	744	742
Height From Mercury Column to Mark	27	39
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 16.27 + 6.86 - 1.1 = 22.03$ $H_1 = 744 - 27 = 717$

$B = 3.10 \times 10^{-3}$ $P = 744.3$

$C = 375 + 39 = 414$ $P_1 = 739.3$

$C_1 = 375 + 27 = 402$ $t = 23.5$

$H = 742 - 39 = 703$ $t_1 = 24.0$

CALCULATIONS

0.54 ml.

VACUUM STABILITY TEST
NND-NADC (SP 9/74

Test Run #3

6/2/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Metallic Lead Sheet	1.0 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
28 27	0.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	749	749
Height From Mercury Column to Mark	15	10
Barometric Pressure	739.3	744.3
Room Temperature	24	23.5

$A = 16.46 + 7.06 - 0.1 = 23.42$

$B = 3.10 \times 10^{-3}$

$C = 377 + 10 = 387$

$C_1 = 377 + 15 = 392$

$H = 749 - 10 = 739$

$H_1 = 749 - 15 = 734$

$P = 744.3$

$P_1 = 739.3$

$t = 23.5$

$t_1 = 24.0$

CALCULATIONS

0.0 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74) Test Run #1 5/17/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Sheet Metallic Lead	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
37	0.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	752	753
Height From Mercury Column to Mark	22	20
Barometric Pressure	736.4	743.8
Room Temperature	22.8	22.0

A = 16.29 + 3.61 - 0.2 = 19.70

B = 3.44×10^{-3}

C = 369 + 20 = 389

C_1 = 369 + 22 = 391

H = 753 - 20 = 733

H_1 = 752 - 22 = 730

P = 743.8

P_1 = 736.4

t = 22.0

t_1 = 22.8

CALCULATIONS

0.11 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/17/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) TFE Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
14 8	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	765	766
Height From Mercury Column to Mark	35	49
Barometric Pressure	742.4	734.5
Room Temperature	23.7	23.6

A = 17.82 + 0.23 - 1.1 = 16.95 H_1 = 765 - 35 = 730

B = 0.92×10^{-3} P = 734.5

C = 366 + 49 = 415 P_1 = 742.4

C_1 = 366 + 35 = 401 t = 23.6

H = 766 - 40 = 717 t_1 = 23.7

CALCULATIONS

0.11 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/17/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Velostat 1804 Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
34	1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	757	759
Height From Mercury Column to Mark	34	51
Barometric Pressure	736.4	743.8
Room Temperature	22.8	22.0

A = 16.49 + 3.57 - 1.2 = 18.86

B = 3.42×10^{-3}

C = 370 + 51 = 421

C_1 = 370 + 34 = 404

H = 759 - 51 = 708

H_1 = 757 - 34 = 723

P = 743.8

P_1 = 736.4

t = 22.0

t_1 = 22.8

CALCULATIONS

0.56 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #1

5/17/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Crystal X Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
28 35	1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	747	748
Height From Mercury Column to Mark	22	24
Barometric Pressure	736.4	743.8
Room Temperature	22.8	22.0

A = 16.29 + 7.06 - 1.2 = 22.15

B = 3.10×10^{-3}

C = 377 + 24 = 401

C_1 = 377 + 22 = 399

H = 748 - 24 = 724

H_1 = 747 - 22 = 725

P = 743.8

P_1 = 736.4

t = 22.0

t_1 = 22.8

CALCULATIONS

0.24 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #1 5/17/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Type V-2 Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
36	1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	751	753
Height From Mercury Column to Mark	30	44
Barometric Pressure	736.4	743.8
Room Temperature	22.8	22.0

A = 16.45 + 3.45 - 1.2 = 18.70

B = 3.51×10^{-3}

C = 356 + 44 = 400

C_1 = 356 + 30 = 386

H = 753 - 44 = 709

H_1 = 751 - 30 = 721

P = 743.8

P_1 = 736.4

t = 22.0

t_1 = 22.8

CALCULATIONS

0.48 ml.

VACUUM STABILITY TEST
NAVORD-NADC (SP 9/74 Test Run #2 5/19/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) TFE Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
5 4	1.1 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	773	774
Height From Mercury Column to Mark	43	53
Barometric Pressure	743.6	740.0
Room Temperature	22.2	23.4

$A = 17.25 + 0.26 - 1.1 = 16.41$ $H_1 = 773 - 43 = 730$

$B = 0.88 \times 10^{-3}$ $P = 740.0$

$C = 361 + 53 = 414$ $P_1 = 743.6$

$C_1 = 361 + 43 = 404$ $t = 23.4$

$H = 774 - 53 = 721$ $t_1 = 22.2$

CALCULATIONS

0.11 ml.

VACUUM STABILITY TEST
ONR-NADC (SP 9/74 Test Run #2 5/19/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Metallic Lead	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
8 8	0.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	775	775
Height From Mercury Column to Mark	38	50
Barometric Pressure	743.6	740.0
Room Temperature	22.2	23.4

A = 17.82 + 0.29 - 0.2 = 17.91

B = 0.94×10^{-3}

C = 361 + 50 = 411

C_1 = 361 + 38 = 399

H = 775 - 50 = 725

H_1 = 775 - 38 = 737

P = 740.0

P_1 = 743.6

t = 23.4

t_1 = 22.2

CALCULATIONS

0.19 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74 Test Run #2 5/19/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Type V-2 Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
24 6	1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	768	766
Height From Mercury Column to Mark	41	70
Barometric Pressure	743.6	740.0
Room Temperature	22.2	23.4

$A = 17.21 + 0.21 - 1.2 = 16.22$

$B = 1.18 \times 10^{-3}$

$C = 361 + 70 = 431$

$C_1 = 361 + 41 = 402$

$H = 766 - 70 = 696$

$H_1 = 768 - 41 = 727$

$P = 740.0$

$P_1 = 743.6$

$t = 23.4$

$t_1 = 22.2$

CALCULATIONS

0.55 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #2

5/19/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide (Dex.) Crystal X Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO. 31 A	SAMPLE VOLUME 1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	747	746
Height From Mercury Column to Mark	13	26
Barometric Pressure	742.4	734.5
Room Temperature	23.7	23.6

$A = 17.95 + 7.22 - 1.2 = 23.97$

$B = 3.09 \times 10^{-3}$

$C = 366 + 26 = 392$

$C_1 = 366 + 13 = 379$

$H = 746 - 26 = 720$

$H_1 = 747 - 13 = 734$

$P = 734.5$

$P_1 = 742.4$

$t = 23.6$

$t_1 = 23.7$

CALCULATIONS

0.19 ml.

VACUUM STABILITY TEST
9ND-NADC (SP 9/74

Test Run #2

5/19/76
100°C for 40 hrs.

SAMPLE IDENTIFICATION	SAMPLE WT.
Lead Azide Velostat 1804 Plastic	0.5 1.0 1.5 gm.
CAPILLARY AND TUBE NO.	SAMPLE VOLUME
#1 E	1.2 ml.

	READINGS AT BEGINNING	READINGS AT END
Height From Mercury Pool to Mark	767	767
Height From Mercury Column to Mark	43	69
Barometric Pressure	743.6	740.0
Room Temperature	22.2	23.4

$A = 17.83 + 0.24 - 1.2 = 16.87$

$B = 0.92 \times 10^{-3}$

$C = 371 + 69 = 440$

$C_1 = 371 + 43 = 414$

$H = 767 - 69 = 698$

$H_1 = 767 - 43 = 724$

$P = 740.0$

$P_1 = 743.6$

$t = 23.4$

$t_1 = 22.2$

CALCULATIONS

0.47 ml.